

## AMENDMENTS TO THE CLAIMS

### Listing of Claims:

1. (Previously presented) A process for production of compounds comprising one or more C18-, C20-, and/or C22-polyunsaturated fatty acids in a transgenic organism comprising:
  - a) introducing, into an organism, at least one nucleic acid sequence which encodes an  $\omega$ -3-desaturase that is capable of desaturating C20- or C22-fatty acids, and
  - b) culturing the organism under conditions which permits the production of one or more C18-, C20-, and/or C22-polyunsaturated fatty acids,wherein the  $\omega$ -3-desaturase is encoded by a nucleic acid sequence comprising:
  - i) the nucleic acid sequence of SEQ ID NO: 1,
  - ii) a nucleic acid sequence encoding the amino acid sequence of SEQ ID NO: 2,
  - iii) a nucleic acid sequence having at least 95% identity with the nucleic acid sequence of SEQ ID NO: 1, or
  - iv) a nucleic acid sequence encoding an amino acid sequence having at least 95% identity with the amino acid sequence of SEQ ID NO: 2.
2. (Previously presented) The process according to claim 1, further comprising introducing into the organism at least one nucleic acid sequence coding for a polypeptide with  $\Delta$ 9-elongase,  $\Delta$ 6-desaturase,  $\Delta$ 8-desaturase,  $\Delta$ 6-elongase,  $\Delta$ 5-desaturase,  $\Delta$ 5-elongase or  $\Delta$ 4-desaturase activity.
3. (Cancelled)
4. (Previously presented) The process according to claim 1, wherein the one or more C18-, C20-, and/or C22-polyunsaturated fatty acids have at least two double bonds.
5. (Previously presented) The process according to claim 1, wherein the transgenic organism is a transgenic microorganism or a transgenic plant.
6. (Previously presented) The process according to claim 1, wherein the transgenic organism is an oil-producing plant, a vegetable producing plant, or an ornamental plant.

7. (Currently amended) The process according to claim 1, wherein the transgenic organism is a transgenic plant selected from the group of the plant families consisting of Adelotheceaceae, Anacardiaceae, Asteraceae, Apiaceae, Betulaceae, Boraginaceae, Brassicaceae, Bromeliaceae, Caricaceae, Cannabaceae, Convolvulaceae, Chenopodiaceae, Crypthecodiniaceae, Cucurbitaceae, Ditrichaceae, Elaeagnaceae, Ericaceae, Euphorbiaceae, Fabaceae, Geraniaceae, Gramineae, Juglandaceae, Lauraceae, Leguminosae, Linaceae ~~or~~ and Prasinophyceae.

8. (Previously presented) The process according to claim 1, wherein the one or more C18-, C20-, and/or C22-polyunsaturated fatty acids are isolated from the organism in the form of their oils, lipids or free fatty acids.

9. (Previously presented) The process according to claim 1, wherein the one or more C18-, C20-, and/or C22-polyunsaturated fatty acids are isolated in a concentration of at least 5% by weight based on the total lipid content of the transgenic organism.

10-24. (Cancelled)

25. (Previously presented) The process according to claim 1, wherein the  $\omega$ -3-desaturase is capable of desaturating C20-fatty acids.

26. (Previously presented) The process according to claim 1, wherein the  $\omega$ -3-desaturase is capable of desaturating C18-, C20- and C22-fatty acids.

27. (Previously presented) A process for increasing the content of C18-, C20- and/or C22-polyunsaturated fatty acids in oils, lipids, or fatty acids in an organism comprising:

a) introducing, into an organism, at least one nucleic acid sequence which encodes an  $\omega$ -3-desaturase that is capable of desaturating C20- or C22-fatty acids, and

b) culturing the organism under conditions which permits the production of C18-, C20- and/or C22-polyunsaturated fatty acids

wherein the  $\omega$ -3-desaturase is encoded by a nucleic acid sequence comprising:

- i) the nucleic acid sequence of SEQ ID NO: 1,
- ii) a nucleic acid sequence encoding the amino acid sequence of SEQ ID NO: 2,
- iii) a nucleic acid sequence having at least 95% identity with the nucleic acid sequence of SEQ ID NO: 1, or

iv) a nucleic acid sequence encoding an amino acid sequence having at least 95% identity with the amino acid sequence of SEQ ID NO: 2.

28. (Previously presented) The process according to claim 27, further comprising introducing into the organism at least one nucleic acid sequence coding for a polypeptide with  $\Delta 9$ -elongase,  $\Delta 6$ -desaturase,  $\Delta 8$ -desaturase,  $\Delta 6$ -elongase,  $\Delta 5$ -desaturase,  $\Delta 5$ -elongase or  $\Delta 4$ -desaturase activity.

29. (Previously presented) The process according to claim 27, wherein the C18-, C20- and/or C22-polyunsaturated fatty acids have at least two double bonds.

30. (Previously presented) The process according to claim 27, wherein the transgenic organism is a transgenic microorganism or a transgenic plant.

31. (Previously presented) The process according to claim 27, wherein the transgenic organism is an oil-producing plant, a vegetable producing plant, or an ornamental plant.

32. (Currently amended) The process according to claim 27, wherein the transgenic organism is a transgenic plant selected from the group of the plant families consisting of Adelotheceaceae, Anacardiaceae, Asteraceae, Apiaceae, Betulaceae, Boraginaceae, Brassicaceae, Bromeliaceae, Caricaceae, Cannabaceae, Convolvulaceae, Chenopodiaceae, Crypthecodiniaceae, Cucurbitaceae, Ditrichaceae, Elaeagnaceae, Ericaceae, Euphorbiaceae, Fabaceae, Geraniaceae, Gramineae, Juglandaceae, Lauraceae, Leguminosae, Linaceae ~~or~~ and Prasinophyceae.

33. (Previously presented) The process according to claim 27, further comprising isolating the oils, lipids, or fatty acids from the organism.

34. (Previously presented) The process according to claim 27, wherein the  $\omega$ -3-desaturase is capable of desaturating C20-fatty acids.

35. (Previously presented) The process according to claim 27, wherein the  $\omega$ -3-desaturase is capable of desaturating C18-, C20- and C22-fatty acids.

36. (Previously presented) A process for production of compounds comprising one or more C18-, C20-, and/or C22-polyunsaturated fatty acids in a transgenic organism comprising:

a) introducing into an organism, at least one nucleic acid sequence which encodes an  $\omega$ -3-desaturase that is capable of desaturating C22:4  $\omega$ -6-fatty acid to C22:5  $\omega$ -3-fatty acid, and

b) culturing the organism under conditions which permits the production of one or more C18-, C20-, and/or C22-polyunsaturated fatty acids.

37. (Previously presented) The process according to claim 36, wherein the one or more C18-, C20-, and/or C22-polyunsaturated fatty acids have at least two double bonds.

38. (Previously presented) The process according to claim 36, wherein the transgenic organism is a transgenic microorganism or a transgenic plant.